**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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| In re Application of Ronald D. Javor et al. | Atty. Docket No: P16081 |
| Application No.: 10/607,796 | Art Unit: 2618 |
| Filed: June 27, 2003 | Examiner: Zhiyu Lu |

Title: MULTIPLE ANTENNA APPARATUS AND METHOD TO PROVIDE INTERFERENCE DETECTION AND CANCELLATION

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Commissioner for Patents
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Alexandria, VA 22313-1450

**APPEAL BRIEF**

**IN SUPPORT OF APPELLANT'S APPEAL**

**TO THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In response to the Final Office Action dated July 3, 2006 and pursuant to Appellant's Notice of Appeal filed on November 3, 2006, Appellant presents this Brief and fee under 37 C.F.R. § 1.17(c) in appeal of the Final Rejection dated July 3, 2006.

## I. REAL PARTY IN INTEREST.

Intel Corporation is the real party in interest.

## II. RELATED APPEALS AND INTERFERENCES.

There are no related appeals or interferences before the Board of Patent Appeals and Interferences known to Appellant, the Appellant's legal representatives, or assignee that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

## III. STATUS OF CLAIMS.

A total of claims 1-19 have been pending in the application and their status is as follows:

Claims 5 and 15 are cancelled; and

Claims 1-4, 6-14, and 16-19 stand finally rejected and are the claims subject to this appeal. The claims appendix includes a copy of the claims subject to this appeal.

The rejections of independent claim 1 and its dependent claims, independent claim 10, and its dependent claims, and independent claim 14 and its dependent claims are appealed.

## IV. STATUS OF AMENDMENTS.

All amendments filed to date have been entered into the record. No amendment after final was made.

## V. SUMMARY OF CLAIMED SUBJECT MATTER.

Embodiments of the present invention relate to a wireless communication device (Fig. 1, 10; Fig. 2, 230) having at least two distinct receiver chains or receiver paths (Fig. 1, 20, 120; Fig. 2, 240). (Specification, paragraphs 10, 11, 14, 15) Each receiver path may include an antenna (Figs. 1-2, 30, 130), low noise amplifier (LNA) (Figs. 1-2, 40, 140), mixer (Figs. 1-2, 50, 150), filter (Figs. 1-2, 60, 160), and analog to digital converter (Figs. 1-2, 70, 170). (Specification, paragraphs 10, 11, 15) Each antenna (Figs. 1-2, 30, 130) is coupled to a different receive path,

and receives a different signal. (Specification, paragraph 20) The different, or, de-correlated, signals are processed by the separate receive paths, and by a digital baseband logic circuit (Figs. 1-2, 200) to provide interference detection and cancellation. (Specification, paragraph 20)

Referring to Appellant's independent claim 1, by way of example, an apparatus is claimed which includes a first antenna (Figs. 1-2, 30) coupled to a first receiver, wherein the first receiver comprises a first low noise amplifier (LNA) (Figs. 1-2, 40) having an input terminal coupled to the first antenna and an output terminal coupled to a first mixer (Figs. 1-2, 50). The apparatus further includes a second antenna (Figs. 1-2, 130) coupled to a second receiver and having a radiation pattern different than a radiation pattern of the first antenna (Specification, paragraph 20), wherein the second receiver comprises a second low noise amplifier (LNA) (Figs. 1-2, 140) having an input terminal coupled to the second antenna and an output terminal coupled to a second mixer (Figs. 1-2, 150). The apparatus further includes a voltage controlled oscillator (VCO) coupled to the first mixer and to the second mixer (Figs. 1-2, 80). (See also: Specification, paragraphs 10, 11, 14, 15, 17)

Referring to dependent claims 2 and 13, by way of example, the first antenna is an omni-directional antenna having a non-directive radiation pattern (Figs. 1-2, 30; Specification paragraph 20) and the second antenna is a directive antenna having a directive radiation pattern (Figs. 1-2, 130; Specification paragraph 20).

Referring to dependent claim 3, by way of example, the first antenna is a whip antenna, stub antenna, or dipole antenna (Figs. 1-2, 30; Specification paragraph 19).

Referring to dependent claim 4, by way of example, the second antenna is a microstrip patch antenna (Figs. 1-2, 30; Specification paragraph 19).

Referring to dependent claim 6, by way of example, the first receiver is a direct conversion receiver (Fig. 1, 20; Specification paragraph 10) and the second receiver is a direct conversion receiver (Fig. 1, 120; Specification paragraph 11).

Referring to dependent claim 7, by way of example, the apparatus further includes a baseband processor coupled to the first receiver and the second receiver (Figs. 1-2, 200; Specification paragraph 10).

Referring to dependent claim 8, by way of example, the first antenna receives a first radio frequency (RF) signal and the second antenna receives a second radio frequency (RF) signal that is not correlated to the first signal (Figs. 1-2, 30, 130; Specification paragraphs 18, 20, 22) and the apparatus further includes a baseband logic circuit adapted to process the first radio frequency (RF) signal and the second radio frequency (RF) signal to provide interference detection and cancellation (Figs. 1-2, 200; Specification paragraph 20).

Referring to dependent claim 9, by way of example, the first receiver is adapted to down convert a first signal from the first antenna (Figs. 1-2, 30; Specification paragraph 10) and the second receiver is adapted to down convert a second signal from the second antenna (Figs. 1-2, 130; Specification paragraph 11).

Referring to independent claim 10, by way of example, a system is claimed, which includes a wireless wide area network (WWAN) device (Fig. 1, 10; Fig. 2, 230; Specification,

paragraph 26). The WWAN device further includes a first antenna (Figs. 1-2, 30) coupled to a first receiver, wherein the first receiver comprises a first low noise amplifier (LNA) (Figs. 1-2, 40) having an input terminal coupled to the first antenna and an output terminal coupled to a first mixer (Figs. 1-2, 50). The WWAN device further includes a second antenna (Figs. 1-2, 130) coupled to a second receiver and having a radiation pattern different than a radiation pattern of the first antenna (Specification, paragraph 20), wherein the second receiver comprises a second low noise amplifier (LNA) (Figs. 1-2, 140) having an input terminal coupled to the second antenna and an output terminal coupled to a second mixer (Figs. 1-2, 150). The WWAN device further includes a voltage controlled oscillator (VCO) coupled to the first mixer and to the second mixer (Figs. 1-2, 80). (See also: Specification, paragraphs 10, 11, 14, 15, 17)

Referring to dependent claim 11, by way of example, the wireless wide area network (WWAN) device is a cellular telephone (Fig. 1, 10; Fig. 2, 230; Specification paragraph 23).

Referring to dependent claim 12, by way of example, at least a portion of the first antenna is external to a housing of the cellular telephone and the second antenna is internal to the housing of the cellular telephone (Figs. 1-2, 30, 130; Specification paragraph 23).

Referring to independent claim 14, by way of example, a method is claimed which includes receiving a first signal from a first antenna (Figs. 1-2, 30) at the input terminal of a first receiver (Figs. 1-2, 40; Specification paragraph 10) and mixing the first signal with an oscillator signal provided by a voltage controlled oscillator (VCO) (Figs. 1-2, 80; Specification paragraphs 10, 14, 15) to provide a first baseband signal (Specification, paragraph 10). The method further

includes receiving a second signal different from the first signal from a second antenna (Figs. 1-2, 130; Specification, paragraph 20) at the input terminal of a second receiver (Figs. 1-2, 140; Specification paragraph 11) and mixing the second signal with the oscillator signal provided by the voltage controlled oscillator (VCO) (Figs. 1-2, 80; Specification paragraphs 11, 14, 15) to provide a second baseband signal (Specification, paragraph 11), wherein the radiation pattern of the first antenna is different than the radiation pattern of the second antenna (Specification, paragraph 20).

Referring to dependent claim 16, by way of example, receiving a first signal comprises receiving the first signal from an omni-directional antenna having a non-directive radiation pattern (Figs. 1-2, 30; Specification paragraphs 18, 20).

Referring to dependent claim 17, by way of example, receiving the first signal from an omni-directional antenna includes receiving the first signal from a whip antenna (Figs. 1-2, 30; Specification paragraph 19).

Referring to dependent claim 18, by way of example, receiving a second signal comprises receiving the second signal from a directive antenna having a directive radiation pattern (Figs. 1-2, 130; Specification paragraphs 18, 20).

Referring to dependent claim 19, by way of example, receiving the second signal from a directive antenna comprises receiving the second signal from a microstrip patch antenna (Figs. 1-2, 130; Specification paragraph 19).

## VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The issues for consideration on this appeal are:

A. Whether the Examiner erred in rejecting independent claim 1 and its dependent claim 3, and independent claim 10 and its dependent claim 11 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,274,388 to Ishizaki et al. (hereinafter "Ishizaki") in view of U.S. Patent No. 6,724,804 to Kegasa et al. (hereinafter "Kegasa").

B. Whether the Examiner erred in rejecting dependent claims 2, 4, and 12-13 under 35 U.S.C. §103(a) as being unpatentable over Ishizaki in view of Kegasa and U.S. Patent No. 6,697,020 to Ying (hereinafter "Ying").

C. Whether the Examiner erred in rejecting dependent claims 6-7 and 9 under 35 U.S.C. §103(a) as being unpatentable over Ishizaki in view of Kegasa and Loke, U.S. Publication No. 2003/0027610 (hereinafter "Loke").

D. Whether the Examiner erred in rejecting dependent claim 8 under 35 U.S.C. §103(a) as being unpatentable over Ishizaki in view of Kegasa, Ying, and Talwar, U.S. Patent No. 5,152,010 (hereinafter "Talwar").

E. Whether the Examiner erred in rejecting independent claim 14 and its dependent claims 16-19 under 35 U.S.C. §103(a) as being unpatentable over Ying in view of Kegasa.

## VII. ARGUMENT

**Claims 1 and 10, and Their Respective Dependent Claims Are Patentable Over Ishizaki In View of the Cited References**

**A.** Claims 1, 3, 10, and 11 are patentable under 35 U.S.C. §103(a) over Ishizaki in view of Kegasa.

Claims 1, 3, 10, and 11 stand finally rejected under 35 U.S.C. §103(a) as being unpatentable over Ishizaki in view of Kegasa. Appellant respectfully requests that these rejections be overturned for the following reasons.

It is well established that *prima facie* obviousness is only established when three basic criteria are met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991) (MPEP 2144).

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary sill in the art. *In re Kotzab*, 217 F.3d 1365, 1370 (Fed. Cir. 2000). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680 (Fed. Cir. 1990). "When the references cited by the

examiner fail to establish a *prima facie* case of obviousness, the rejection is improper and will be overturned." *In re Fine*, 837 F.2d 1071, 1074 (Fed. Cir. 1988).

Ishizaki discloses an antenna switching scheme wherein the outputs of two receivers are monitored to switch them to the antenna which is in the better receiving condition. (Fig. 1, Col. 1, lines 35-37, Col. 3, lines 9-13) Ishizaki's switched receiver design is capable of processing only one of two received signals at any time. (Col. 3, lines 9-13)

The Final Office Action of 7/3/06 admits that Ishizaki fails to teach or suggest that the first receiver comprises a first low noise amplifier (LNA) having an input terminal coupled to the first antenna and an output terminal coupled to a first mixer, and that the second receiver comprises a second low noise amplifier having an input terminal coupled to the second antenna and an output terminal coupled to a second mixer, and a voltage controlled oscillator (VCO) coupled to the first mixer and to the second mixer. The Office Action instead relies on a secondary reference (Kegasa) to make up for this deficiency, alleging "it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the LNAs, mixers, and VCO coupling taught by Kegasa into the apparatus of Ishizaki in order to compensate or cancel out noise from the received signal."

It is respectfully submitted that a *prima facie* case of obviousness has not been established since: (i) there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings as suggested in the Office Action; and (ii) even when

combining the cited references as suggested, the prior art references when combined fail to teach or suggest each and every claim limitation. Without both of these elements, a *prima facie* case of obviousness is not established and a rejection under 35 U.S.C. § 103(a) is improper (MPEP 2143).

(i) THERE IS NO MOTIVATION TO COMBINE REFERENCES

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Even if every element of the claimed invention is disclosed by a combination of references, without a proper motivation to combine, a rejection based on *prima facie* case of obviousness is improper. There are three possible sources for a motivation to combine reference: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. *In re Rouffet*, 149 F.3d 1350 (Fed. Cir. 1998).

In the present case, it is alleged that the LNAs, mixers, and VCO coupling taught by Kegasa would be obvious to combine with the switched receiver design of Ishizaki in order to compensate or cancel out noise from Ishizaki's received signal. (Final Office Action, page 3, lines 3-11) Kegasa teaches a frequency converter to result in an improved accuracy level of frequency and employs a phase locked oscillator for a relatively low local-oscillation frequency only. (Col. 4, lines 21-24) Kegasa provides a radio communications system including a transmitter and receiver which results in an improved utilization of frequencies and lightens the

cost imposed on a subscriber by incorporating the frequency converter. (Col. 4, lines 26-30) Ishizaki teaches a switched antenna/receiver combination whereby one of two receiver paths is selected in order to give the best reception of a radio wave. (Col. 3, lines 9-20). Ishizaki is not concerned with frequency accuracy, nor is Ishizaki concerned with utilization of frequencies. Ishizaki is concerned only with monitoring the outputs of two receivers and switching to the receiver that provides the best received signal. Moreover, it is not clear that adding the frequency conversion circuitry of Kegasa to the switched receiver circuitry of Ishizaki would result in the noise cancellation and/or compensation alleged in the final office action. Accordingly, there is no motivation to combine the LNA/mixer/VCO configuration taught by Kegasa with the switched receiver configuration taught by Ishizaki, other than piecemeal reconstruction of Appellant's claims based on the hindsight of Appellant's disclosure.

Since there is no proper motivation for combining the LNA/mixer/VCO configuration of Kegasa with the switched receiver configuration disclosed by Ishizaki, the rejections of claims 1, 3, 10, and 11 under 35 U.S.C. §103(a) are improper.

(ii) THE RESULTING COMBINATION FAILS TO TEACH THE CLAIMED LIMITATIONS

Even assuming arguendo that it would be proper to combine the references as suggested by the Office Action, the resultant combination would still fail to teach or suggest a first receiver including a first LNA and a first mixer, a second receiver including a second LNA and second mixer, and a VCO coupled to the first mixer and the second mixer.

Ishizaki teaches a switched antenna/receiver combination whereby one of two receiver paths is selected in order to give the best reception of a radio wave. (Col. 3, lines 9-20). Kegasa teaches a transmitter including a first LNA and a first mixer, a receiver including a second LNA and a second mixer, and a VCO coupled to the first mixer in the transmitter and the second mixer in the receiver. Combining the teachings of Ishizaki with the LNA/mixer/VCO coupling taught by Kegasa would result in the addition of a transmitter to Ishizaki, and the VCO would be coupled to both a mixer in the receiver and a mixer in the transmitter. This is not what is claimed by Appellants. Thus, neither Ishizaki, nor Kegasa, independently or in combination, teach or suggest a first receiver including a first LNA and a first mixer, a second receiver including a second LNA and second mixer, and a VCO coupled to the first mixer and the second mixer.

Because the suggested combination of prior art references is improper and because taken alone or in combination the prior art references fail to teach or suggest each and every claimed limitation, Appellant respectfully submits a *prima facie* case of obviousness under 35 U.S.C. § 103(a) has not been established. Accordingly, reconsideration and withdrawal of these §103 rejections are respectfully requested.

**B.** Claims 2, 4, and 12-13 are patentable under 35 U.S.C. §103(a) over Ishizaki in view of Kegasa and Ying.

Claims 2, 4, and 12-13 stand finally rejected under 35 U.S.C. §103(a) as being unpatentable over Ishizaki in view of Kegasa and Ying. Appellant respectfully requests that these rejections be overturned for the following reasons.

As described above in Section A, the combination of Ishizaki and Kegasa is improper for the reasons stated. Furthermore, the combination of Ying with Ishizaki and Kegasa, is improper at least because there is no motivation to combine the references.

As stated above, the objective of Ishizaki is to provide the best received signal by switching between two antennas. The objective of Kegasa is to improve frequency utilization in a radio. The objective of Ying is to include both a GPS and a cellular antenna in a miniaturized mobile telephone. (Col. 2, lines 9-11 and 19-28) Neither Ishizaki nor Kegasa are concerned with including different antennas corresponding to different application purposes. Accordingly, there is no motivation to combine what is taught by Ying with the LNA/mixer/VCO configuration taught by Kegasa and the switched receiver configuration taught by Ishizaki, other than piecemeal reconstruction of Appellant's claims based on the hindsight of Appellant's disclosure.

Since there is no proper motivation for combining that taught by Ying with the LNA/mixer/VCO configuration of Kegasa and the switched receiver configuration disclosed by Ishizaki, the rejection of claims 2, 4, and 12-13 under 35 U.S.C. §103(a) is improper.

**C.** Claims 6-7 and 9 are patentable under 35 U.S.C. §103(a) over Ishizaki in view of Kegasa and Loke.

Claims 6-7 and 9 stand finally rejected under 35 U.S.C. §103(a) as being unpatentable over Ishizaki in view of Kegasa and Loke. Appellant respectfully requests that these rejections be overturned for the following reasons.

As described above in Section A, the combination of Ishizaki and Kegasa is improper for the reasons stated. Furthermore, the combination of Loke with Ishizaki and Kegasa is improper at least because there is no motivation to combine the references.

As stated above, the objective of Ishizaki is to provide the best received signal by switching between two antennas. The objective of Kegasa is to improve frequency utilization in a radio. The objective of Loke is to provide an enhanced direct conversion receiver that includes a frequency conversion circuit and a control circuit. (Paragraphs 9-11) Neither Ishizaki nor Kegasa are concerned with enhancing the direct conversion of a radio frequency signal. Accordingly, there is no motivation to combine that taught by Loke with the LNA/mixer/VCO configuration taught by Kegasa and the switched receiver configuration taught by Ishizaki, other than piecemeal reconstruction of Appellant's claims based on the hindsight of Appellant's disclosure.

Since there is no proper motivation for combining that taught by Loke with the LNA/mixer/VCO configuration of Kegasa and the switched receiver configuration disclosed by Ishizaki, the rejection of claims 6-7 and 9 under 35 U.S.C. §103(a) is improper.

**D.** Claim 8 is patentable under 35 U.S.C. §103(a) over Ishizaki in view of Kegasa, Ying, and Talwar.

Claim 8 stands finally rejected under 35 U.S.C. §103(a) as being unpatentable over Ishizaki in view of Kegasa, Ying, and Talwar. Appellant respectfully requests that these rejections be overturned for the following reasons.

As described above in Sections A and B, the combinations of Ishizaki, Kegasa, and Ying are improper for the reasons stated. Furthermore, the combination of Talwar with Ishizaki, Kegasa, and Ying is improper at least because there is no motivation to combine the references.

As stated above, the objective of Ishizaki is to provide the best received signal by switching between two antennas. The objective of Kegasa is to improve frequency utilization in a radio. The objective of Ying is to include both a GPS and a cellular antenna in a miniaturized mobile telephone. The objective of Talwar is to provide interference cancellation in a radio communication system. (Col. 1, lines 64-68, Col. 2, lines 1-19) Neither Ishizaki nor Kegasa nor Ying are concerned with interference cancellation. Accordingly, there is no motivation to combine what is taught by Talwar with the LNA/mixer/VCO configuration taught by Kegasa, the switched receiver configuration taught by Ishizaki, and the application specific antenna configuration of Ying, other than piecemeal reconstruction of Appellant's claims based on the hindsight of Appellant's disclosure.

Since there is no proper motivation for combining that taught by Talwar with that taught by Ishizaki, Kegasa, and Ying, the rejection of claim 8 under 35 U.S.C. §103(a) is improper.

**Claim 14 and Its Dependent Claims Are Patentable Over Ying In View of Kegasa**

**E.** Claims 14 and 16-19 are patentable under 35 U.S.C. §103(a) over Ying in view of Kegasa.

Claims 14 and 16-19 stand finally rejected under 35 U.S.C. §103(a) as being unpatentable over Ying in view of Kegasa. Appellant respectfully requests that these rejections be overturned for the following reasons.

The combination of Ying and Kegasa is improper at least because there is no motivation to combine the references.

Ying discloses a miniaturized mobile telephone device including both a GPS and a cellular antenna. (Col. 2, lines 9-11 and 19-28) Ying's system is capable of receiving a first signal (cellular) from a first antenna and receiving a second signal (GPS) from a second antenna. However, Ying does not disclose mixing the first signal with an oscillator signal provided by a VCO to provide a first baseband signal and mixing the second signal with an oscillator signal provided by the VCO to provide a second baseband signal.

In the present case, it is alleged that the mixing of the first signal with an oscillator signal provided by a VCO to provide a first baseband signal and the mixing of the second signal with the oscillator signal provided by the VCO to provide a second baseband signal, as taught by Kegasa would be obvious to combine with receiving of a first (cellular) and second (GPS) signal

as taught by Ying in order to compensate or cancel out noise from Ying's received signal. (Final Office Action, page 5, lines 1-18)

Kegasa teaches a frequency converter to result in an improved accuracy level of frequency and employs a phase locked oscillator for a relatively low local-oscillation frequency only. (Col. 4, lines 21-24) Kegasa provides a radio communications system including a transmitter and receiver which results in an improved utilization of frequencies and lightens the cost imposed on a subscriber by incorporating the frequency converter. (Col. 4, lines 26-30) The objective of Ying is to include both a GPS and a cellular antenna in a miniaturized mobile telephone. (Col. 2, lines 9-11 and 19-28) Ying is not concerned with frequency accuracy, nor is Ying concerned with utilization of frequencies. Ying is concerned only with the inclusion of both a GPS antenna and a cellular antenna in a single mobile telephone form factor. Accordingly, there is no motivation to combine the mixing of signals taught by Kegasa with the dual antenna (GPS/cellular) receiving capabilities taught by Ying, other than piecemeal reconstruction of Appellant's claims based on the hindsight of Appellant's disclosure.

Since there is no proper motivation for combining the mixing of signals as taught by Kegasa with the receiving of GPS and cellular signals disclosed by Ying, the rejection of claims 14 and 16-19 under 35 U.S.C. §103(a) is improper.

## Conclusion

Appellant respectfully submits that all the pending claims in this patent application are patentable and request that the Board of Patent Appeals and Interferences overrule the Examiner and direct allowance of the rejected claims.

If any fee insufficiency or overpayment is found, please charge any insufficiency or credit any overpayment to Deposit Account No. 50-0221.

Respectfully submitted,

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## VIII. CLAIMS APPENDIX

1. (Previously presented) An apparatus, comprising:

a first antenna coupled to a first receiver, wherein the first receiver comprises a first low noise amplifier (LNA) having an input terminal coupled to the first antenna and an output terminal coupled to a first mixer;

a second antenna coupled to a second receiver and having a radiation pattern different than a radiation pattern of the first antenna, wherein the second receiver comprises a second low noise amplifier (LNA) having an input terminal coupled to the second antenna and an output terminal coupled to a second mixer; and

a voltage controlled oscillator (VCO) coupled to the first mixer and to the second mixer.

2. (Original) The apparatus of claim 1, wherein the first antenna is an omni-directional antenna having a non-directive radiation pattern and wherein the second antenna is a directive antenna having a directive radiation pattern

3. (Original) The apparatus of claim 1, wherein the first antenna is a whip antenna, stub antenna, or dipole antenna.

4. (Original) The apparatus of claim 1, wherein the second antenna is a microstrip patch antenna.

5. (Cancelled)

6. (Original) The apparatus of claim 1, wherein the first receiver is a direct conversion receiver and wherein the second receiver is a direct conversion receiver.

7. (Original) The apparatus of claim 1, further comprising a baseband processor coupled to the first receiver and the second receiver.

8. (Original) The apparatus of claim 1, wherein the first antenna receives a first radio frequency (RF) signal and the second antenna receives a second radio frequency (RF) signal that is not correlated to the first signal and further comprising a baseband logic circuit adapted to process the first radio frequency (RF) signal and the second radio frequency (RF) signal to provide interference detection and cancellation .

9. (Original) The apparatus of claim 1, wherein the first receiver is adapted to down convert a first signal from the first antenna and wherein the second receiver is adapted to down convert a second signal from the second antenna.

10. (Previously presented) A system, comprising:

a wireless wide area network (WWAN) device, comprising:

a first antenna coupled to a first receiver, wherein the first receiver comprises a first low noise amplifier (LNA) having an input terminal coupled to the first antenna and an output terminal coupled to a first mixer;

a second antenna coupled to a second receiver and having a radiation pattern different than a radiation pattern of the first antenna, wherein the second receiver comprises a second low noise amplifier (LNA) having an input terminal coupled to the second antenna and an output terminal coupled to a second mixer; and

a voltage controlled oscillator (VCO) coupled to the first mixer and to the second mixer.

11. (Previously presented) The system of claim 10, wherein the wireless wide area network (WWAN) device is a cellular telephone.

12. (Original) The system of claim 11, wherein at least a portion of the first antenna is external to a housing of the cellular telephone and wherein the second antenna is internal to the housing of the cellular telephone.

13. (Original) The system of claim 10, wherein the first antenna is an omni-directional antenna having a non-directive radiation pattern and wherein the second antenna is a directive antenna having a directive radiation pattern.

14. (Previously presented) A method, comprising:

receiving a first signal from a first antenna at the input terminal of a first receiver and mixing the first signal with an oscillator signal provided by a voltage controlled oscillator (VCO) to provide a first baseband signal; and

receiving a second signal different from the first signal from a second antenna at the input terminal of a second receiver and mixing the second signal with the oscillator signal provided by the voltage controlled oscillator (VCO) to provide a second baseband signal, wherein the radiation pattern of the first antenna is different than the radiation pattern of the second antenna.

15. (Cancelled)

16. (Original) The method of claim 14, wherein receiving a first signal comprises receiving the first signal from an omni-directional antenna having a non-directive radiation pattern.

17. (Original) The method of claim 16, wherein receiving the first signal from an omni-directional antenna includes receiving the first signal from a whip antenna.

18. (Original) The method of claim 14, wherein receiving a second signal comprises receiving the second signal from a directive antenna having a directive radiation pattern.

19. (Original) The method of claim 18, wherein receiving the second signal from a directive antenna comprises receiving the second signal from a microstrip patch antenna.

## IX. EVIDENCE APPENDIX

Not Applicable

## X. RELATED PROCEEDINGS APPENDIX

Not Applicable